G 5492 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Fourth Semester

Branch : Electronics and Communication Engineering

EC 010 405—ANALOG COMMUNICATION (EC)

(Common for all Branches)

(New Scheme—2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. What is the main advantage of FM over AM ?
2. Mention any *three* applications of SSB.
3. Define Heterodyning.
4. Define CDF.
5. What is meant by noise figure ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Explain, how phase modulation can be generated from frequency modulation.
7. What are the advantages of ring modulator ?
8. Explain the limitations of Foster-Seeley discriminator.
9. What is sample space ?
10. What is meant by white noise ? Explain.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*
Each question carries 12 *marks.*

11. Describe the relationship between the carrier and sideband powers in a DSBFC wave.

Or

Turn over

12. What is a VSB signal ? Explain.

13. Explain the operation of a Balance modulator.

Or

14. Explain in detail about any *one* method to detect SSB.

15. Draw the block diagram of a superheterodyne receiver and explain the function of each block.

Or

16. Explain how FM signal is generated using reactance modulator.

17. State and prove any two properties of Rayleigh distribution.

Or

18. Define ergodic process. Expalin the difference between ergodic process and stationary process.

19. Explain in detail about common channel signalling.

Or

20. Describe the term noise equivalent temperature and describe its significance.

(5 × 12 = 60 marks)

G 5457 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Fourth Semester

EN 010 402—PRINCIPLES OF MANAGEMENT

(Common to AI, AU, EC, EI, IC, IT, ME, MT, PO, PE and ST branches)

(New Scheme—2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Define vision and its significance in management.
2. Define labour turnover.
3. What is PERT ? List its application.
4. What is capital ? List its types.
5. List the tools of sales promotion.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Explain the importance of span of control in an organization.
7. Write a note on the function of Trade Unions.
8. Explain the functions of production department.
9. Briefly explain on the elements of cost.
10. Differentiate between selling and marketing concept.

(5 × 5 = 25 marks)

Part C

Answer any **one** *question from each module.*
Each full question carries 12 *marks.*

Module I

11. Write detailed notes on (a) Motivating ; (b) Communicating ; and (c) Co-ordinating.

Or

Turn over

12. Explain in detail on (a) Line organization ; and (b) Line and Staff organization.

Module II

13. Write a detailed note on the process of recruitment and selection of manpower.

Or

14. Write notes on the following (a) Need and function of quality circle ; (b) Methods of settling industrial disputes.

Module III

15. The following table lists the activities of a maintenance project :

Activity	*Duration (in months)*	*Activity*	*Duration (in months)*
1—2 ...	2	4—7 ...	3
1—3 ...	2	4—8 ...	1
1—4 ...	1	6—8 ...	4
2—5 ...	4	7—9 ...	5
3—6 ...	5	8—9 ...	3
3—7 ...	8		

(a) Draw the project network.

(b) Find the critical path and duration of the project.

(c) Suppose we are required to employ a special equipment on activities 1—3, 3—6, 2—5, 5—8 and 8—9 one at a time. Will it affect the duration of the project ? Explain.

Or

16. Explain in detail on various types of production with its features.

Module IV

17. Write detailed notes on (a) Components of working capital ; (b) Need for working capital ; (c) Assessment of working capital.

Or

18. Write detailed notes on (a) Types of cost ; (b) Cost control methods.

Module V

19. Discuss on (a) Channels of distribution and its effectivenss ; (b) Pricing strategies.

Or

20. Describe on types of advertising media and the factors governing the advertising media selection.

(5 × 12 = 60 marks)

G 5499 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Fourth Semester

Branch : Applied Electronics and Instrumentation/Electronics and Communication Engineering

AI 010 406/EC 010 406 – ANALOG CIRCUITS – II [AI, EC]

(New Scheme – 2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 3 *marks.*

1. Define and explain CMRR. What is its significance?
2. What are the characteristics of a practical op-amp? Explain.
3. State and explain the condition for op-amp oscillator.
4. Explain the features of switched capacitor resistor.
5. Define and explain the parameters of ADC and DAC.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each full question carries 5 *marks.*

6. Explain the frequency response of differential amplifiers.
7. Define and explain :
   (a) Slew Rate
   (b) SVRR.
   (c) CMRR.
8. Draw an op-amp comparator and explain.
9. Explain the characteristics of Notch filter.
10. Explain the working principle of weighted resistor DAC with a neat diagram.

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*

Each full question carries 12 *marks.*

11. Discuss the characteristics of an ideal op-amp. Also discuss the non ideal characteristics of differential amplifier.

Or

12. Explain in detail the following :

    (a) BJT differential pair.

    (b) MOS differential amplifier.

13. (a) Draw an op-amp with output buffer circuit and explain it in detail.

    (b) Derive an expression for closed loop gain of an op-amp.

Or

14. Discuss in detail the frequency compensation and slew rate in 2-stage op-amp with neat diagrams.

15. Explain the applications of op amp in detail. Derive the expressions for voltage for inverting amplifier and op-amp scalar.

Or

16. Draw an op-amp Wein bridge oscillator circuit. Explain its working principle in detail. Derive the condition for oscillation.

17. Bring out the design details of first order low pass filter, with an example.

Or

18. Give an account on :

    (a) Switched capacitor integrator.

    (b) Biquadratic filters.

19. Draw a single slope ADC circuit. Explain its principle of operation and applications in detail.

Or

20. Write technical notes on :

    (a) Applications of PLL.

    (b) Emitter coupled VCO.

    (c) Astable multivibrator using 555 IC.

(5 × 12 = 60 marks)

19. (a) Find inverse Laplace transform of

(i) $X(s) = \frac{1}{s}(s+2)$. (ii) $\left(1+e^{-25}\right)/\left(3s^2+2s\right)$.

(b) Write notes on :

(i) Bilateral Laplace transform.

(ii) Relation between z-transform and Fourier transform.

Or

20. Determine z-transform and ROC of $x(n) = \left(\frac{2}{3}\right)^n u(n) + \left(-\frac{1}{2}\right)^n u(n)$ and for unit impulse signal.

(5 × 12 = 60 marks)

G 5463 (Pages : 4) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Fourth Semester

Branch : Applied Electronics and Instrumentation/Electronics and Communication/ Electronics and Instrumentation Engineering

AI 010 403/EC 010 403/EI 010 403—SIGNALS AND SYSTEMS [AI, EC, EI]

(New Scheme—2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Define energy and power signals.
2. Derive the expression for convolution sum.
3. Find Fourier transform of $e^{at}\,u(t)$.
4. Give definition for DTFS and CTFS.
5. Find the Convolution of the following sequences :

$x(n) = \{1, \underset{\uparrow}{1}, 2\}$ $h(n) = \{\underset{\uparrow}{1}, 1, 1\}$.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Determine whether the signal is power signal or energy signal or neither ?

$$x_1(t) = \frac{1}{1+|t|}.$$

7. Find the inverse z-transform of $x(z)$ using long division method :

$$x(z) = z/\left(2z^2 - 3z + 1\right)$$

ROC : $|z| < \frac{1}{2}$.

Turn over

8. Find the Fourier transform of the decaying exponential.

9. Give the properties of convolution integral.

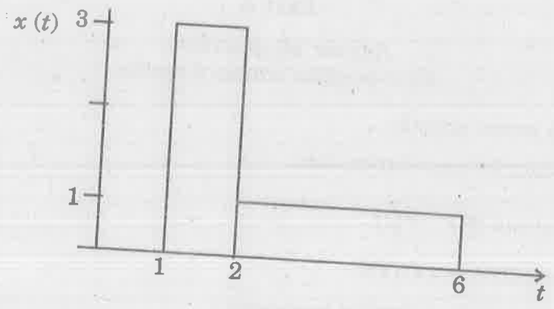
10. Verify the causality and stability of the system $h(n) = 2^n u(n-1)$.

Part C

(5 × 5 = 25 marks)

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. An LTI system is having impulse response $h(t) = u(-t-1)$ for which the input signal applied is shown in figure. Find output at $t = 4$ and $t = 0.5$.



Or

12. Let $x(t) = -t+1 \quad ; \quad -1 \le t \le 0$

$t \quad ; \quad 0 \le t < 2$

$2 \quad ; \quad 2 \le t < 3$

$0 \quad ; \quad$ elsewhere

Sketch the signals $x(t), x(t-2), x(t+3)\ x(-3t-2), x\left(\frac{2t}{3}+\frac{1}{2}\right)$.

13. Consider a causal LTI system with frequency response $(H(j\Omega)) = \frac{1}{j\Omega+3}$.

For a particular input $x(t)$, this system is observed to produce output $y(t) = e^{-3t} u(t) - e^{-4t} u(t)$.

Determine $x(t)$.

Or

14. Find Fourier transform of the following :—

(a) $x(t) = \sin(\pi t)\, e^{-2t} u(t)$.

(b) $x(t) = e^{-3|t-2|}$.

15. Find DTFT of $x(n) = \left(\frac{1}{2}\right)^n u(n)$ and plot its magnitude and phase spectrum.

Or

16. Find $x(n)$, given that $X(\Omega) = e^{-j4\Omega}$, $\pi/2 < |\Omega| < \pi$.

17. State and prove Sampling theorem. Also discuss aliasing by taking an example.

Or

18. (a) Find the order N of a low-pass butterwith filter to meet the following specifications :

$\delta_p = 0.001$ $\qquad$ $\delta_s = 0.001$

$\Omega_p = 1$ rad/sec $\qquad$ $\Omega_s = 2$ rad/sec.

(b) Let Ω_p and Ω_s denote the desired passband and stop band edge frequencies of an analog low-pass filter. Let δ_p be the pass band ripple and δ_s be the stop band attenuation. Show that the order of the filter required to meet these specifications is :

$$N \ge \frac{\log\left(1/d\right)}{\log\left(1/k\right)},$$

where $d = \sqrt{\frac{(1-\delta_p)^{-2}-1}{\delta_s^{-2}-1}}$ = discrimination factor

and $k = \frac{\Omega_p}{\Omega_s}$ = selectivity factor.

18. (a) Find the inverse Z.T. of the following functions :

$$\text{(i) } X_1(z) = \frac{z^{-9}}{z-a} \quad ; \text{ (ii) } X_2(z) = \frac{z^{-2}}{z-3}.$$

(4 marks)

(b) Given $x(n) = a^n u(n) - b^{2n} u(-n-1)$. What condition must hold on 'a' and 'b' for the z-transform to exist.

(4 marks)

(c) Find the Z.T. of $y(n) = \left(-\frac{1}{3}\right)^n u(-n-2)$. (4 marks)

19. (a) State the properties of power spectral density. (4 marks)

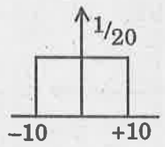
(b) Consider the random process X (t) = A $\cos(w_0 t + \theta)$ A and w_0 are constants, θ is a random variable uniformly distributed in the interval 0 to π. Check whether random process is WSS or not.

(4 marks)

(c) Write the relationship between ACF and PSD. (4 marks)

Or

20. (a) A continuous random variable is uniformly distributed in the interval – 10 to + 10. Determine its statistical averages (mean, variance, standard deviation) ?



(6 marks)

(b) Explain (i) Central limit theorem ; (ii) AWGN ; and (iii) Ergodic process. (6 marks)

[5 × 12 = 60 marks]

G 5545

(Pages : 4) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Fourth Semester

Branch : Electronics and Communication/Applied Electronics and Instrumentation/Electronics and Instrumentation/Information Technology

SIGNALS AND SYSTEMS [LAST]

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 4 *marks.*

1. Explain causal and non-causal system with an example.
2. Explain the properties of LTI system.
3. Explain Parseval's power theorem.
4. Find the Nyquist rate and Nyquist interval for the following signals :

$$\text{(a) } x_1(t) = \left(\frac{\sin 200\pi t}{\pi t}\right) \quad ; \text{ (b) } x_2(t) = 5\cos 1000\pi t \cos 4000\pi t.$$

5. State periodicity, time-shift and frequency shift properties of DTFT.
6. Find the DTFT of the signal $x(n) = \{-2, -1, 0, 1, 2\}$ (↑ at 0)
7. Explain the properties of ROC of Laplace transform.
8. Find z transform for the following signals ?

(a) $-a^n u(-n-1)$; (b) $[a^n \sin wn]u(n)$.

9. State and properties of probability density function and probability distribution function.
10. Define strictly stationary random process and wide-sense stationary random process.

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. Find whether the following systems are :
    (a) Linear/non-linear.
    (b) Time variant/time invariant.
    (c) Static/dynamic.

    (i) $2t\frac{dy}{dt}(t)+4y(t)=2x(t)$. (3 marks)

    (ii) $4\frac{d^2y(t)}{dt^2}+2\frac{dy(t)}{dt}+y(t)=\frac{3d}{dt}x(t)$. (3 marks)

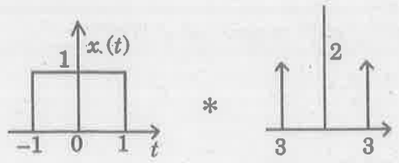
    (iii) $n^2y^2(n)+y(n)=x^2(n)$. (3 marks)

    (iv) $y(n+1)\,y(n)=4x(n)$. (3 marks)

Or

12. (a) Find the convolution of the signals $x(t)=e^{-3t}u(t)$ and $h(t)=u(t-2)$. (5 marks)

    (b) Find the following terms :
    (i) $x(t+5) * S(t-7)$.
    (ii) $x(t) * S(at+b)$.
    (iii)



(7 marks)

13. (a) Find the fundamental frequency of the composite signals :
    (i) $x(t)=2+3\cos(0.2t)+\cos(0.25t+\pi/2)+4\cos(0.3t-\pi)$.
    (ii) $V(t)=30\sin 100t+10\cos 300t+6\sin(500t+\pi/4)$.

    (4 marks)

    (b) Find the FT of following signals :

    (i) $\frac{1}{3+jt}$ [use duality theorem]. (2 marks)

    (ii) $e^{-2(t-3)}u(t-3)$. (2 marks)

    (iii) $e^{-2t}u(t-3)$. (2 marks)

    (iv) $rect\left(\frac{t+3}{4}\right)$. (2 marks)

Or

14. (a) Find the energy in the signal $x(t)=\frac{\sin at}{\pi t}$. (4 marks)

    (b) For the periodic signal, $x(t)=2+\cos\left[\frac{2\pi t}{3}\right]+4\sin\left[\frac{5\pi t}{3}\right]$. Find the exponential Fourier series coefficients.

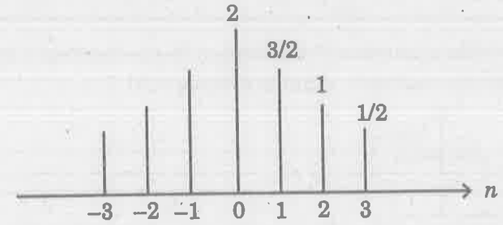
    (8 marks)

15. (a) Explain frequency differentiation and convolution property of DTFT. (4 marks)

    (b) Find the DTFT of (i) $y_1(n)=(1/4)^n u(n-3)$; (ii) $y_2(n)=S(n-n_0)$. (8 marks)

Or

16. (a) Find the DTFT of the signal shown in figure :



    (6 marks)

    (b) Find the I.F.T. of $Y(e^{jw})=\frac{1}{1-\frac{1}{2}e^{-j10w}}$. (6 marks)

17. Find the L.T. of the following signals with R.O.C. :
    (a) $x_1(t)=e^{-t}u(t)+e^{-3t}u(t)$.
    (b) $x_2(t)=1\forall t$.
    (c) $x_3(t)=e^{-|t|}$.
    (d) $x_4(t)=\text{sgn}(t)$.
    (e) $x_5(t)=t^2u(t-1)$.
    (f) $x_6(t)=te^{-at}u(t)$.

    (12 marks)

Or